

collage

a random collection of facts, opinions, and
miscellany published from time to time by the editor
of MOTOROLA'S ENGINEERING BULLETIN

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April, 1967

A *we'll remember* *APRIL* . . . but will you be glad?

Aha! Most of you think this is going to be an April Fool issue of COLLAGE. Well, you're wrong. Since COLLAGE is generally considered pretty foolish at every other time of the year, we thought we'd make the April issue a rare cultural and enlightening experience. To start off then, forget about April as being just "April Fool" month. A lot of significant events happened in other Aprils, and we're using this space to recount just a few of them. I hope you'll note, though, that there is a haunting thread of unity through all these events . . . a thread of unity that makes the thoughtful scholar want to sit pensively and stroke his chin . . . and then quietly retch.

April 23, 1567—Shakespeare born

April 28, 1789—Fletcher Christian leads mutiny
aboard HMS Bounty

April 21, 1836—Battle of San Jacinto

April 21, 1856—First railroad crosses Mississippi

April 3, 1860 — Pony express begins

April 18, 1906—San Francisco Earthquake

April 14, 1912—Titanic sinks

April 18, 1942—Gen'l Doolittle and crew bomb
Tokyo

Sounds like a lot of random historical data, doesn't it? Well, maybe it would be if it weren't for these two other April milestones:

April 14, 1894—Edison shows Kinescope publicly

April 1923—Lee DeForest showed the first sound-
on-film movies

So, had it not been for the existence of April, we would not only be without movies, but also without subject matter for about a thousand of them. Contemplate the nuances of *that* for a while, and remember where you read it first.

we're 100% on the Winged Horse



... and that's no bull

Pegasus, as you all know, is that winged horse that was born full-size from the blood that flowed when Perseus, a lad fraught with hostilities, cut off the head of Medusa. Whether or not this makes Medusa the mother of that freakish horse is questionable, but then you never can be sure what to expect from a lady who has snakes growing out of her head ("Dahling, I couldn't do a thing with my hair today; it's molting season you know!"). Anyway, today's Pegasus is one of NASA's scientific satellites going around checking on micrometeorites and whether or not they constitute a hazard to space travel. There have been three Pegasuses (Pegasi?) launched so far, and Motorola has had some fancy electronic gear aboard each ... diplexers, hybrid ring isolators and low pass filters that permit two transmitters and two receivers to make use of the same antenna on board the spacecraft. After 5 years of accumulated experience, NASA/Huntsville was kind enough to inform us that the Motorola equipment has performed with a 100% reliability record ... and that's no myth, Greek or otherwise. So, unless someone out there can find a way to top 100% reliability, let's hear it for our Antenna & Microwave group in Scottsdale!



TRAGEDY ON THE HIGH SEAS

Do you know, or even care, what happens when you toss one of our Chicago Center's remarkable little sonobuoys out of an airplane and into the

ocean? Well, there ensues a series of little events that culminate in one of the great tragedies of our time:

First, little blades come out like a helicopter to slow the descent. When splash-down occurs, the little blades thoughtfully drop off. Then a VHF antenna pops up, while at the other end a retaining plate pops off and a yellow dye cake colors the surrounding water (if the water is already yellow, you're in trouble). A hydrophone then tumbles out and drops to the end of a sixty-foot cable. Following that, the battery compartment is flooded to energize the salt-water activated battery. Finally, after 1 minute, the listening operation commences.

The tragedy of all this is that each sonobuoy has an automatic scuttling device that limits the floating period to between one and fifteen hours. (Maybe that's why we've delivered over 100,000 of them to the Navy in the last few years.) Even though that's the way the Navy wants them, it hurts us to know that we spend all that time and effort for something that scuttles itself instinctively after so short a time. Now we know how a mother lemming must feel.

If you're the sort who gets his kicks listening to underwater transmissions, our sonobuoys may be just the thing for you. Our Chicago Center will send you (in a waterproof cover) loads of tear-stained spec sheets and the like.

KLASS TELLS



Phil Klass, that much quoted avionics editor of *Aviation Week*, responded to last time's COL-LAGE piece on UFO's. In the "editorial" we tweaked Phil's "there must be a terrestrial explanation" approach, used his name, and made some sport of his attitude.

Well, Phil proved he has class. He wrote us a nice note, thanked us for the mention, and gave us his very latest UFO thinking ... even before it gets to *Av Week*.

Some excerpts:

"After extensive research in local pubs, I discover

that there have been roughly 10,000 UFO reports, and, since the birth of the airplane, approximately 10,000 fighter pilots have died in combat, or in bed.

"It is well known that UFO's love to buzz aircraft, people and cars, to fly weird maneuvers . . . be complete 'show-offs' . . . precisely the same qualities that mark a fighter pilot.

"Obviously, UFOs must be the ghosts of dead fighter pilots, freed of the limitations of their aluminum airframes! I find this a much more plausible explanation for UFOs than that they are extraterrestrial spacecraft.

"I know a fighter pilot ghost when I see one!"



HOW HIGH THE HYBRID

Since Motorola is not a Hughes, JPL or NASA, we have to get our little enjoys where we can find them in the Space Communications business. Sure, lots of people know that we've participated in most of the USA space flights, but the TV networks haven't exactly been knocking each other over trying to get us to hold press conferences after each success. So we'll get our glory where we can. With this belabored prefix, then, don't make sport over our joyful spirit when we announce that the first hybrid integrated circuits on the moon will be Motorola's. That'll be during the next Surveyor shot, and the circuits in question are in the Voltage Controlled Oscillators. Remember, everyone should be first at something or the ego dies. Our Telemetry people have as much pride as anyone.

* * * * *

TELEMETRY WITHOUT END

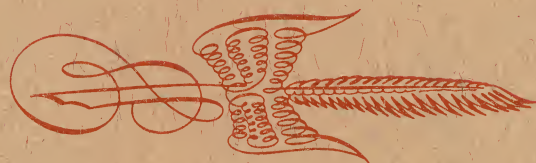
Since we're on the subject of our Voltage Controlled Oscillators, we'd like to add that we didn't even start out to make such things. But during our work for Mariner Mars, we couldn't find components from standard sources (to put it delicately) that would meet the rigors of that 9

month trip (please, no LSD jokes). Anyway, JPL o.k.'d our bid to build our own components and lo! now we're in the VCO business.

Other places you'll be seeing our telemetry transmitters will be on Poseidon, Nimbus, the Minute-man CTLI configuration, and the Interrogation, Recording and Location Subsystem (IRLS) transmitter under development for Goddard. Among those units are some that are 25-watt all solid-state transmitters at 460Mc, and 10-watt all solid-state transmitters at S-Band.

As we've told you many times, there's a bit of Motorola in just about every communications and telemetry space system made or proposed by our side . . . telemetry transmitters, phase-coherent transponders, digital command systems . . . and so on and on.

Our Aerospace Center has all kinds of literature on this sort of thing . . . from grubby spec sheets to fancy brochures. Write for a bunch.



LITTLE-KNOWN FACTS ABOUT NICE PEOPLE



Below are listed some men who should be reasonably familiar to most of you. On the right is a random listing of relatively unpublicized facts in

their lives. See if you can match the name with the fact or event.

- | | |
|-----------------------------|--|
| A. <i>Coulomb</i> | 1. Wrote a long poem in Latin on the nature and benefits of science. |
| B. <i>Oersted</i> | 2. Invented method of least squares at 18. |
| C. <i>Volta</i> | 3. Independently discovered principle of induction about same time as Faraday. |
| D. <i>Kelvin</i> | 4. Studied, researched and lectured on chemistry and metaphysics at U. of Copenhagen. |
| E. <i>Gauss</i> | 5. Former president of the National Geographic Society. |
| F. <i>Ohm</i> | 6. A nobleman who avoided the guillotine during the French revolution by hiding in a country house in Blois. |
| G. <i>Henry</i> | 7. At age 82 devised a machine for copying sculpture. |
| H. <i>Roentgen</i> | 8. Produced most of his memorable work while a high school teacher in Cologne. |
| I. <i>Bell</i> | 9. Refused the personal nobility due him when awarded the Royal Bavarian Order of the Crown for his discovery. |
| J. <i>Watt</i> | 10. Helped lay the first Atlantic cable. |
| K. <i>Elisha Cooke, Jr.</i> | 11. Probably didn't invent the double-diode germanium rectifier. |
| L. <i>Steinmetz</i> | 12. Said to have written on a blackboard at GE, where a no-smoking sign had been posted, "No smoking, no Steinmetz." |

Answers, A through J: A-6, B-4, C-1, D-10, E-2, F-8, G-3, H-9, I-5, J-7.



AGAIN, THE POOR WORKING GIRL

This thing may be getting out of hand. You've sent us yet another batch of supposedly unintended typos made by secretaries who have the near-impossible job of translating engineer-talk and handwriting into English. As we've said before, we're not always sure just how accidental these mistakes are . . . it's one of the few opportunities for fun-type girls to show a little creativity. Keep it up, ladies!

<i>As typed</i>	<i>As intended</i>
Empty eye	M. T. I. (moving target indication)
output frequency	output frequency
. . . not apply to Navy	
Underwear	
Demolition* Underwater . . .
. . . feasible technique for obtaining good rape tape . . .
Chin Co., Teague, Va.	Chincoteague, Va.
wine wound visitors	wire wound resistors
Soppler Simulator	Doppler Simulator
Voltage rumps	Voltage ramps

We would like to name all the people that sent these in, but perhaps their secretaries would be annoyed. Thanks, anyway, and keep them coming.

*Received this one from 3 different sources, so it must be true.



never fear the **TROPOSPHERE**

Or indicate fright at line-of-sight

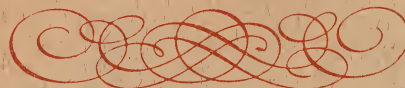
This isn't the first time, nor will it be the last time we talk to you about Deltaplex Mark II. Don't ask us, by the way, about Mark I. If it ever existed, nobody's talking about it.

Anyway, Deltaplex is our very own trademarked name. It's taken from "delta modulation" and "multiplex." That we didn't scramble the names some other way, like, say, "Mod-U-Mult" attests to the innate good taste of our Chicago Center people.

Deltaplex Mark II, as our marketeers are always saying, is "a fresh approach to multichannel transmission over tropospheric scatter and line-of-sight microwave systems." Deltaplex multiplexers are, they continue, "specifically designed for application in the environment of long-haul, multi-channel troposcatter or microwave systems. Up to 96 channels are readily accommodated over troposcatter and up to 300 channels through the interconnecting microwave link."

These are but two moving snatches from a new brochure called, strangely enough, "Motorola Deltaplex Mark II." Though only 6 pages long, there are plenty of words under such vibrant headings as, "Troposcatter problems," "Why Deltaplex" (with no question mark), "Path 'intermod' Considerations," "Transmission System," and "Deltaplex Mark II Provides." Also, there are several dull, albeit meaningful, diagrams for those of you who don't like to read.

Order enough from our Chicago Center to paper your office.



MORE CULTURAL ENRICHMENT

Since this publication is devoted to the educational advancement of its readers, COLLAGE would be remiss if it didn't share the following with you: the American Society of Civil Engineers selected, as one of the seven Engineering Wonders of the United States, the Chicago Sewage Disposal System. And there wasn't a dry eye in Chicago when the award was made. We could tell you what the others are, but we won't. Too much culture at one time is hard to stomach.

EAST meets WEST more or less



You may have caught this bit of dialogue in any of a hundred movies in which an Occidental is trying to communicate with an Oriental. You know, the Occidental will say something in labored pidgeon-English and the Oriental will answer in a manner that would make you think he taught John Gielgud how to speak. It's hardly good for a snicker any more but when it happens in real life it can be sort of amusing, or at least heart-warming, as in the following case.

One of our field engineers, Les Ferguson, was in Saigon recently R&R'ing from his chores of mother-henning our APS-94 Side Looking Radar sets for

the Army. He saw a young Vietnamese sitting in a Jeep that was equipped with a Motorola two-way radio. A true company man, Les asked the driver how the set was working, but the lad answered in Vietnamese. So Les pointed to the Motorola batwing (M) on the radio and showed him a similar trademark on his own briefcase. . . . to which the boy answered, "Hey man, that's A-number-1 radio, A-number-1 company."



Replacing Engineers for Fun & Profit



Those of you who remember our abortive engineering soap opera, "Forest D'Leigh, ms," will know that our hero had been given an assignment to write a WESCON paper for his callous chief engineer, R. A. "Crunch" Bradley. The paper was to be titled "How to replace engineers for fun and profit using computers, technicians and draftsman more efficiently." Naturally, our idealistic young hero was appalled, and was indulging himself in a bit of soul-searching as we left him.

Well, not to be outdone, our very own Don Mark, a senior engineer in the Reliability and Components group, has written a paper that smacks suspiciously of what the nefarious Bradley had in mind. It's called "No Design Checkmates" but what it's really about is computer-aided circuit design. It ran in our recent *Engineering Bulletin*, so you may have seen it already, but we have reprints for any of you who want it. It has a lot of nice charts and graphs, plus two pictures of the dashing author standing in front of our SDS computer (for which we didn't charge SDS a thing, though we wish they had delivered a few shares of their stock about the same time they delivered the computer).

MORE ERUDITE ADVERTISING RESEARCH

Last COLLAGE gave you a chance to tell our advertising department what magazines you read, and if you are in a position to recommend purchase of things we make. We also sort of hinted that we'd make the results known to you. We've had about an 8% response so far, which is not sensational, but then again not bad for this sort of thing. However, we're a bit dubious about letting the results be known. The reason being, we inadvertantly left some pretty good magazines off the list (the publishers and editors were quick to let us know), and then, since COLLAGE falls into competitive hands, why should we give the results of our research to the competition? But in the spirit of altruism that makes us such nice people, we'll forthwith list the top magazine vote getter* in each category . . . but the first magazine space salesman that tries to use the results on us is automatically off the approved vendor list. After all this was not a survey conducted by a reputable research organization, so it really doesn't prove much. A real researcher could probably shoot holes all through it. Results:

MAGAZINE CATEGORY

TOP VOTE-GETTER

Electronic	Electronic Design
Business & General News	Wall St. Journal (bus.) Time (general news)
Aerospace	Aviation Week
Military	Air Force/Space Digest
Scientific	Scientific American
Participation in Purchasing	Just about everyone. (Which makes us wonder why, since you all seem to read the hard-sell material in COLLAGE, you don't purchase more of our products).

We also asked you to circle your three "favorite" magazines, but disclosing the results here would be giving away a little too much valuable data, despite the disclaimers above. Anyway, thanks for your cooperation.

*It should be noted that many winners led their runner-ups by only a few votes. In other cases it was a runaway. In some categories, the first four or five magazines polled more votes than the winners in other categories. This is the kind of data we're keeping to ourselves, and further reason we're cautioning anyone connected with any of the publications from gloating (or crying) too much.

Dept. of MISCONSCREWED MEANINGS



We've always known that grammar and spelling are not necessarily the prime attributes of technical types (or COLLAGE editors, either). But someone who shall remain nameless seems to be either a put-on-artist, or the greatest "creative misspeller" of all time. This prominent engineer has a Boswell who follows him around and checks all his longhand memos, reports, and the like. There now exists a directory of this man's work, and here are some examples.

As spelled

Misconscruwed
Proglamate
Piddlance
Rappaport
Flustrated

As intended (maybe)

Misconstrued
Promulgate
Pittance
Rapport
Frustrated

This, of course, is a corollary of our "Pity the Poor Working Girl" series. But pity his secretary even more than most.

SOLID-STATE TRANSMISSION RECEPTION AND CONFUSION

No one should blame you if you were becoming a bit confused, if not bored, by our continual reference to our CM lines of VHF and UHF transmitters, receivers, and transceivers. We've had the CM-610, 620, 510 and 520, and while we've had no complaints, we've wondered if you've exactly understood what the differences are between them. Well now, to add to the fun, we're

sheepishly announcing a couple more . . . the Motorola CM-630 VHF transmitter and the Motorola CM-640 UHF transmitter! It should come as no surprise to COLLAGE readers that each of these rack-sized units uses all silicon solid-state circuitry, weighs but 40 lbs., requires only minimum maintenance and tuning time (whatever minimum means), and has output filters to limit all spurious radiation, including harmonics, to 80db below the carrier. Both are fixed-tuned, single frequency transmitters that are capable of being tuned from 100 to 180 MHz (VHF) and 225 to 400 MHz for the other one. Now, does everyone have that straight? We may ask questions, so you'd better write to our Chicago Center for specs on these and all the other CM things.



PUZZLE of the month

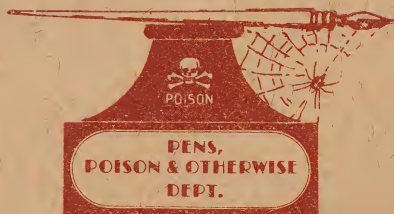
The answer to last time's puzzle is: $r \cong 2.06$. Some who got it right were Craig Becker of the Dynalectron Corp. (first correct answer received), Walter Penney, Lou Eisen, Joe Zveglic and Charles Foster.

Though no one made use of it, the simplest approach to the solution is through use of the Theorem of Ptolemy: "In any 4-sided figure, the product of the diagonals is equal to the sum of the products of the opposite sides."

Also, we should report that a couple of readers gave us the back of their hand because the lines inscribed in the semicircle were not drawn exactly to scale. Very precise persons indeed! Anyway, today's puzzle comes from Walter Penney of Greenbelt, Maryland, one of the winners, and goes like this:

"A mischievous boy squirted some honey on a 4' x 8' door in a wavy stream (actually tracing out the curve $\frac{3}{4}x^3 - 5x^2 + 10x$, with the floor and the left-hand side of the door taken as the axes). An ant crawling along the floor started at the origin and licked his way along the curve. At what point on the door will the ant be at the highest point above the floor?"

The correct answer, as usual, will appear in the next issue.



More out-of-context quotes from the editor's mail sack:

5 CRUZIEROS

J. D. Ryder — "... I thought it perhaps timely that I contribute to your support and enclose a Brazilian 5 cruzieros note . . ." (Ed. note: Timely? What's up? Do you know something we don't?)

YOU AND GOLDWATER

D. A. Findlay — "Between you and Goldwater, Scottsdale really has something going for it. I'm not sure what." (Ed. note: Let us know when you find out.)

SPLIT

T. R. Davis — "... but you surely do a good job of splitting infinitives." (Ed. note: To sometimes split an infinitive isn't so bad; it's ending sentences with prepositions that really tees me off.)

FOURTH SPACIAL DIMENSION

W. C. M. — "The 'object' becomes the 'image' by translating itself through the fourth spacial dimension."

PLEASE!

A. D. — "Please do not publish any portion of that letter." (Ed. note: Right!)

D'L

C. Hill — "B.B.F.D.'L.M.S. (Bring Back Forest D'Leigh, m.s.)"

That's all we have room for now. Do write, though, and expose your deepest insecurities to COLLAGE. We're going to compile them and prepare a list. We're sure it'll prove you're no worse off than anyone else. Till next time, then, when and if . . .



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